

### REMARKS

Claims 1-21 remain pending in the present application. By this amendment, claims 1, 3-4, 9, and 14-21 are amended without adding any new subject matter. In the Office Action, claims 3-9 and 14-21 stand rejected under 35 U.S.C. § 112, second paragraph. The Examiner's rejections of these claims are respectfully traversed. Accordingly, the Examiner is respectfully requested to reconsider the § 112 rejections of the claims 3-9 and 14-21.

Claims 1-9 stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent Application Publication No. 2003/0072285 to *Onggosanusi* et al. (hereinafter "*Onggosanusi*"). The Applicants respectfully disagree. As amended, claim 1 calls for a method of processing a block of information including forming separately at least two error coded streams from the block of information. Support for this limitation may be found on lines 20-23 on page 6 of the Applicants' specification. These independently formed two error coded streams are transmitted in response to a confirmation message. As defined in the Applicants' specification, for example, using the method of claim 1, the two or more bit streams separately undergo channel encoding and modulation and are formatted in a Chase packet or an IR sub-packet, depending on the HARQ protocol employed. Then they undergo a MIMO encoding step for each stream to be transmitted and/or received by at least one antenna of a multiple antenna system.

The *Onggosanusi* reference teaches first processing a block of information and then splitting that processed block of information, *i.e.*, a particular frame M into P sub-streams. *See*, paragraph [0014] on page 1 in the *Onggosanusi* reference. Instead of forming separately at least two error coded streams from a block of information, *Onggosanusi* describes a method in which data in a frame is first encoded, interleaved, modulated and then merely split into P-streams.

Therefore, absent separately forming at least two error coded streams from the processed block of information, claim 1 limitations are not anticipated by the *Onggosanusi* reference. Thus, the Examiner is respectfully requested to reconsider § 102 rejection of claim 1 and claims depending therefrom since the amended independent claim 1 is in condition for allowance.

More specifically, the *Onggosanusi* reference discloses a hybrid HARQ system with Chase packet decoding or incremental redundancy sub-packet decoding in which a plurality of transmission antennas are used for sending a plurality of sub-streams formed from the processed data in a particular frame. The data in a particular frame, *m*, is encoded, interleaved, modulated, and then split into *P* sub-streams. The two or more error coded streams of data do not separately undergo channel encoding and modulation and are not formulated in a particular packet type, such as a Chase packet or an IR sub-packet, depending upon a HARQ protocol being employed. That is, the *Onggosanusi* reference does not describe encoding two or more error coded streams independently from a processed block of information, so there does not appear to be any separate formation of error coded streams from the same block of information, as claimed in amended claim 1.

Absent a per-stream encoding, for example, various encoded IR (incremental redundancy) sub-packets or Chase packets may not be simultaneously transmitted at a given time because in a wireless packet data communication the correctness of a packet or a block of data received is determined by a CRC (cyclic redundancy code) check at a receiver. The HARQ technique taught or suggested by the *Onggosanusi* reference may not fully exploit the characteristics of MIMO channels by providing for improved data throughput and system capacity. Instead, for example, Figure 3 in the Applicants' specification shows an aggregate HARQ operation with MIMO with

independent coding, modulation, and data rate for each transmit stream. In Figure 4, for example, per transmit stream HARQ operation for use with MIMO with independent coding, modulation and data rate for each transmit stream is shown. Thus, if any one of the streams is decoded correctly, then it need not be re-transmitted. However, Applicants respectfully submit that the *Onggosanusi* method does not describe a HARQ system for per-stream coding for multiple antenna systems. In a multiple transmit antenna system, by dividing the data into a number of transmit streams and encoding these signals separately, a relatively better performance of a HARQ technique in a MIMO situation may be obtained, achieving a higher throughput in wireless systems.

Claims 1-4 and 7-9 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,657,325 to *Lou* et al. (hereinafter "*Lou*"). Unlike forming separately at least two error coded streams from a processed block of information, as claimed in amended claim 1, the *Lou* reference merely takes an information packet from data source 10 and sends it to an error detection coder 20, which encodes the information packet with an error detection code. In this manner, there is no independent coding, modulation, and data rate provided for each transmit stream in an aggregate HARQ operation with MIMO, as shown in Figure 3 of Applicants' specification. Accordingly, the *Lou* reference fails to anticipate the claim limitations of claim 1 and other rejected claims. Thus, claims 1-4 and 7-9 should be allowable in view of the *Lou* reference. *See*, column 3, lines 20-25 in the *Lou* reference.

Claims 1, 3-11, and 13-21 stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,101,168 to *Chen* et al. (hereinafter "*Chen*"). Rather than forming separately at least two error coded streams from a processed block of information, as claimed in amended

claim 1, the *Chen* reference sends an error transmission and re-transmission in the same frame with a new packet within a data signal, which is encoded by an encoder 122. See, column 4, lines 65-67 and the abstract of the *Chen* reference. The *Chen* reference appears to be silent with respect to forming the error coded streams separately or independently from a processed block of information. In contrast, the *Chen* reference teaches a hybrid ARQ system that uses a plurality of channels to error coded streams. *Chen* does not describe separately or independently forming the error coded streams, as disclosed in the Applicant's specification, so the *Chen* reference fails to anticipate claim 1 limitations. For at least this reason alone, the Examiner is respectfully requested to reconsider the rejection of claims 1, 3-11, and 13-21 over the *Chen* reference.

Claim 12 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over the *Chen* reference. The Examiner admits that the *Chen* reference does not teach multiple receiving antennas. The Examiner takes an official notice that multiple receiving antennas is well known. Applicants submit that the claim 12 is not obvious in view of the *Chen* reference, either alone or in combination with the official notice. The *Chen* reference does not provide any suggestion or motivation to modify the reference or combine reference teachings to obtain the invention in claim 12. Based on this reason and/or at least the reasons presented above in the context of claim 1 rejection over the *Chen* reference under § 102, even if the *Chen* reference is modified using the multiple receiving antennas, the method of amended claim 1 could not result. Accordingly, a *prima facie* case of obviousness rejection of claim 12 is absent. Therefore, it is submitted that the Examiner please reconsider the § 103 rejection of claim 12. The Examiner is respectfully requested to reconsider all the pending claims.

In view of these amendments and remarks, the application is now in condition for allowance and the Examiner's prompt action in accordance therewith is respectfully requested. If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is respectfully requested to call the undersigned at the Houston, Texas telephone number (713) 934-4089 to discuss the steps necessary for placing the application in condition for allowance.

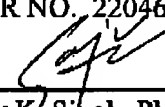
Date:

09/01/2004

Respectfully submitted,

WILLIAMS, MORGAN & AMERSON, P.C.  
CUSTOMER NO. 22046

By:

  
Sanjeev K. Singh, Ph.D.  
under 37 CFR § 10.9(b)  
10333 Richmond, Suite 1100  
Houston, Texas 77042  
(713) 934-7000  
(713) 934-7011 (facsimile)  
AGENT FOR APPLICANT(S)